

CLAIMS

I Claim:

1. A system for handoff using a power line communication network, wherein said system comprising:
 - 5 a. At least one untethered device with an ability to wirelessly communicate; and
 - b. At least one tethered device with an ability to wirelessly communicate and an ability to communicate using a power line communication system; and
 - c. A means to handoff said untethered device from said tethered device to at least one communication network, or from said communication network to said tethered device, or
- 10 from said communication network and at least one mesh communication network connected to said power line communication system.
2. The system in accordance with Claim 1, wherein said untethered device not physically connected to said power line communication network comprising:
 - 15 a. An antenna;
 - b. A transceiver to send and receive information;
 - c. A bi-directional coupling means, between said transceiver and said antenna; and
 - d. A secure communication protocol used to identify said device through network addressing method that can be directly altered or updated using said power line
- 20 communication network;
3. The system in accordance with Claim 1, wherein said tethered device electrically connected to said power line communication network within a first cell comprising:
 - 25 a. An antenna;
 - b. A transceiver to send and receive information;
 - c. A bi-directional coupling means, between said transceiver and said antenna;
 - d. A power line communication system;
 - e. A bi-directional coupling means, between said transceiver and said power line communication system; and
 - f. A secure communication protocol used to identify said device through network addressing method that can be directly altered or updated using said power line
- 30 communication network.
4. The system in accordance with Claim 1, wherein said mesh communication network comprises several untethered devices individually wirelessly connected together so that the last untethered

device is connected to a tethered device connected to a communication network so as to bridge the farthest untethered device onto said tethered device; or comprises an individual untethered device wirelessly connected to a tethered device connected to a communication network.

5 5. The system in accordance with Claim 1, wherein said communication network within said first cell or a second cell can comprise a mesh communication network which can be several untethered devices individually wirelessly connected together so that the last untethered device is connected to a tethered device connected to a communication network so as to bridge the farthest untethered device onto said tethered device or can comprise an individual untethered device

10 10. wirelessly connected to a tethered device connected to a communication network comprising a power line communication network, an ATM network, an Ethernet network, a Gigabit Ethernet network, a PCI-Express network, a fiber optics network, a local area loop, a standard cellular network, a home power line network, a digital subscriber line network, a cable modem network, a cable television network, a copper line network, a plain old telephone subscriber line network, a packet based network, an 802.11 network, a Bluetooth network, a ultra-wideband network, or other similar network creating a mesh network.

15 6. The system in accordance with Claim 1, wherein said communication network can be a tethered device connected to a network comprising a power line communication network, an ATM network, an Ethernet network, a Gigabit Ethernet network, a PCI-Express network, a fiber optics network, a local area loop, a standard cellular network, a home power line network, a digital subscriber line network, a cable modem network, a cable television network, a copper line network, a plain old telephone subscriber line network, a packet based network, an 802.11 network, a Bluetooth network, a ultrawideband network, or other similar network creating a mesh network.

20 7. The system in accordance with Claim 1, wherein said means to handoff said untethered device between said tethered device within said first cell to said communication network within said first cell or said second cell, or between said communication network within said first cell or said second cell to said tethered device within said first cell, or between said communication network within said first cell or said second cell and said mesh communication network wired to a power line communication system within said first cell or said second cell comprising:

25 a. A means for determining positioning or signal power of all untethered devices and tethered devices within wireless range; and

- b. A means for varying or keeping constant the signal power output of all untethered devices in proportion to positioning or received signal power between each untethered device and farthest device within wireless range; and
 - c. A means for varying or keeping constant the signal power output of all tethered devices in proportion to positioning or received signal power between each tethered device and farthest device within wireless range to create a new first cell with new wireless radius that may or may not overlap with said second cell; and
 - d. A means for evaluating if the positioning or received signal power of said untethered device is more optimally connected to said communication network, said mesh communication network connected to a power line communication system, or said tethered device; and
 - e. A means for communicating through said power transmission line communication network, or through said wired network, or through wireless communication to analyze said tethered device's or said communication network's or said mesh communication network's position or received signal power from said untethered device, and the capacity of said tethered device or said communication network device or said mesh communication network to connect to said untethered device; and
 - f. A means to handoff said untethered device from said tethered device within said first cell to said communication network within said first cell or said second cell such that the first untethered device disconnects from the second tethered device while the second tethered device connects to said communication network, or from said communication network within said first or said second cell to said tethered device within the first cell such that said untethered device disconnects from said communication network while said untethered device connects to said tethered device, or from said communication network within said first cell or said second cell and said mesh communication network connected to a power line communication system within said first or said second cell such that said untethered device disconnects from said communication network while said untethered device connects to said mesh communication network.

30 8. The system in accordance with Claim 1, wherein said tethered device can be entirely housed in a sunlight photo detector attached to a utility pole or street light, or in an apparatus screwed into a light socket, or an enclosure inductively attaching around a power transmission line, or an enclosure plugging into an electrical outlet, or an enclosure hanging from a utility pole.

35 9. The system in accordance with Claim 1, wherein said tethered or said untethered device can communicate using infrared, ultraviolet, laser, visible light, magnetic, ultrasonic, acoustic,

impulse, ultra-wideband, or electromagnetic energy and use any combination or individual protocol of Bluetooth, IEEE 802.16, IEEE 802.15, IEEE 802.11, ultra-wideband, GSM, CDMA, EDGE, GPRS, CDMA, TDMA, 3G, 4G, OFDM, flash OFDM, or other communication method supporting handoff.

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10. A system in accordance with Claim 1, wherein said tethered or said untethered device can also communicate with different devices or communication networks using a communication method or protocol that does not support handoff.
- 10 11. The system in accordance with Claim 1, wherein said power line communication system can be implemented using direct spread spectrum, frequency hopping, magnetic, OFDM, ultra-wideband, impulse, or other communication method supporting power transmission line communication.
- 15 12. The system in accordance with Claim 1, wherein said tethered device attached to said power line communication system can repeat data from other tethered devices attached to said power line communication network or repeat data from other tethered devices attached to said communication network or repeat information from said mesh communication network or repeat information from a wireless network or repeat data from other networks in which said tethered device can communicate.
- 20 13. The system in accordance with Claim 1, wherein said tethered device can track and locate untethered devices including monetary instruments and individuals, and based on this real time positioning transmit and receive explicit advertising, HDTV, radio, voice, video graphics, geographic content, or other information in accordance with a specific regional security.
- 25 14. The system in accordance with Claim 1, wherein said tethered device does not integrate a receiver where said receiver is located in a different location such that said tethered device uses a co-located receiver over said power line communication network or said communication network as if said transmitter was located in said tethered device; or does not integrate a transmitter where said transmitter is located in a different location such that said tethered device uses a co-located transmitter over said power line communication network or said communication network as if said transmitter was located in said tethered device; or does not integrate both a transmitter and receiver where said transmitter and receiver is located in a different location such that said tethered device uses a co-located transmitter and receiver over said power line communication
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network or said communication network as if said transmitter and receiver was located in said tethered device.

15. A system for switching using a power line communication network, wherein said system
5 comprising:

- a. A bridge device with the ability to communicate over a power line communication network with at least one first communication network linked into said bridge device and with at least one second communication network linked out of said bridge device; and
- b. A means to switch in to the front end of said power line communication network from said first communication network to at least one third communication network using said bridge device or a means to switch out of the back end of said power line communication network from said second communication network to at least one fourth communication network using said bridge device or a means to switch in to the front end and out of the back end of said power line communication network from said first communication network to at least one third communication network into said bridge device and from said second communication network to at least one fourth communication network out of said bridge device.

16. The system in accordance with Claim 15, wherein said first communication network and said
20 second communication network comprises a wireless network, a power line communication network, an ATM network, an Ethernet network, a Gigabit Ethernet network, a PCI-Express network, a fiber optics network, a local area loop, a standard cellular network, a home power line network, a digital subscriber line network, a cable modem network, a cable television network, a copper line network, a plain old telephone subscriber line network, a packet based network, an
25 802.11 network, a Bluetooth network, a ultra-wideband network, or other similar network creating a mesh network.

17. The system in accordance with Claim 15, wherein said means to switch in to the front end of said power line communication network from said first communication network to at least one third communication network using said bridge device or a means to switch out of the back end of said power line communication network from said second communication network to at least one fourth communication network using said bridge device or a means to switch in to the front end and out of the back end of said power line communication network from said first communication network to at least one third communication network into said bridge device and from said second communication network to at least one fourth communication network out of said bridge device comprising:

- a. A means to connect said first communication network, said second communication network, said third communication network, or said fourth communication network through said bridge device such that an individual communication network can communicate over said power line communication network; and
- 5 b. A means to connect said bridge device with said power line communication network using a power line communication system such that said power line communication network can communicate with said first communication network, said second communication network, said third communication network, or said fourth communication network; and
- 10 c. A means to disconnect said first communication network with said power line communication network while connecting said third communication network with said power line communication network using said bridge device or a means to disconnect said second communication network with said power line communication network while connecting said fourth communication network with said power line communication system using said bridge device or a means to disconnect both first communication network and second communication network with said power line communication network while connecting both third communication network and fourth communication network with said power line communication network using said bridge device.
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- 20 18. The system in accordance with Claim 15, wherein said bridge device has the ability to communicate over a communication network which comprises a mesh communication network which can be several untethered devices individually wirelessly connected together so that the last untethered device is connected to a tethered device connected to a communication network so as to bridge the farthest untethered device onto said tethered device or can comprise an individual untethered device wirelessly connected to a tethered device connected to a communication network comprising a power line communication network, an ATM network, an Ethernet network, a Gigabit Ethernet network, a PCI-Express network, a fiber optics network, a local area loop, a standard cellular network, a home power line network, a digital subscriber line network, a cable modem network, a cable television network, a copper line network, a plain old telephone subscriber line network, a packet based network, an 802.11 network, a Bluetooth network, a ultra-wideband network, or other similar network creating a mesh network.
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- 35 19. The system in accordance with Claim 15, wherein said bridge device has the ability to communicate over a communication network which comprises a wireless network, a power line communication network, an ATM network, an Ethernet network, a Gigabit Ethernet network, a PCI-Express network, a fiber optics network, a local area loop, a standard cellular network, a

home power line network, a digital subscriber line network, a cable modem network, a cable television network, a copper line network, a plain old telephone subscriber line network, a packet based network, an 802.11 network, a Bluetooth network, a ultra-wideband network, or other similar network creating a mesh network.

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20. A method for power line communication system handoff comprising:

- a. A means for determining positioning or signal power of all untethered devices and tethered devices within wireless range; and
- b. A means for varying or keeping constant the signal power output of all untethered devices in proportion to positioning or received signal power between each untethered device and farthest device within wireless range; and
- c. A means for varying or keeping constant the signal power output of all tethered devices in proportion to positioning or received signal power between each tethered device and farthest device within wireless range to create a new first cell with new wireless radius that may or may not overlap with a second cell; and
- d. A means for evaluating if the positioning or received signal power of an untethered device is more optimally connected to a power line communication network, a communication network, a mesh communication network connected to a power line communication system, or a tethered device; and
- e. A means for communicating through said power line communication network, or through said communication network, or through wireless communication to analyze said tethered device's or said communication network's or said mesh communication network's position or received signal power from said untethered device, and the capacity of said tethered device or said communication network or said mesh communication network to connect to said untethered device; and
- f. A means to handoff said untethered device between said tethered device within said first cell to said communication network within said first cell or said second cell such that said untethered device disconnects from said tethered device while said untethered device connects to said communication network, or between said communication network within said first or said second cell to said tethered device within said first cell such that said untethered device disconnects from said communication network while said untethered device connects to said tethered device, or between said communication network within said first cell or said second cell and said mesh communication network connected to said power line communication system within said first cell or said second cell such that said untethered device disconnects from the said communication network while said untethered device connects to said mesh communication network.